

Cytological Evaluation of Superficial Lymphadenopathy: A Three- Year Study

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ABSTRACT

Background: The purpose of the study is to find out the various cytomorphology of palpable superficial lymph nodes and to determine the diseases commonly affecting the lymph nodes and their prevalence in relation to age, sex and anatomical location. **Methods:** The study was a retrospective descriptive study, comprised of 500 patients with peripheral lymphadenopathy who attended Cytology OPD at Zoram Medical College, Falkawn, Mizoram during the period of August 2016 to July 2019. FNAC was done with the help of 23G needle with a negative suction from 20ml syringe. Smears from the aspirates were routinely stained with May-Grünwald-Giemsa. Acid fast bacilli (AFB), Papaniculaou (PAP) stains were done as and when required. **Results:** Nonspecific reactive lymphadenitis was the most common cytomorphological diagnosis accounting for 69% of the cases followed by Metastatic carcinoma accounting for 9.2%. Tuberculous lymphadenitis was seen in 7.4%, Granulomatous lymphadenitis accounted for 6%, and suppurative lymphadenitis accounted for 4.4%. **Conclusion:** The knowledge of the pattern of lymphadenopathy of a particular geographical area is a very useful diagnostic aid for clinicians and pathologists alike. In the present study, nonspecific reactive lymphadenitis was the commonest pattern affecting all age groups. Metastatic lymph node was the second most common reflecting the high incidence of carcinomas in Mizoram. Metastasis was most commonly seen in the age group of more than 40 years. The commonest site involved in all age groups was cervical lymph node.

Keywords: Cytomorphology, FNAC, Lymphadenitis, Lymph nodes.

INTRODUCTION

Lymphadenopathy is one of the commonest presentations among patients of all age groups. It results from various etiologies and possesses diagnostic problems. Lymph node fine needle aspiration cytology (FNAC) is valuable in solving the diagnostic problems of clinical adenopathy. Cytological examination of FNA smears can determine whether lymphadenopathy is due to reactive hyperplasia, infection, metastatic malignancy or lymphoma. The usefulness of the procedure in the staging and diagnosis of various malignant and lymphoproliferative tumors, as well as its role in distinguishing reactive hyperplastic lymph node from lymphoma has been documented. Due to its rapid, safe, inexpensive and relatively high diagnostic accuracy, it is the preferred first line of investigation for any patient presenting with a lymph node swelling.

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The knowledge of the pattern of lymphadenopathy in a given geographical region is essential for making a confident diagnosis or suspecting a disease. The present study was undertaken to assess the cytomorphology patterns of palpable superficial lymph nodes and to determine the diseases commonly affecting the lymph nodes and their prevalence in relation to age, sex and anatomical location.

MATERIALS AND METHODS

The study was a retrospective descriptive study conducted in Cytology section of Department of Pathology, Zoram Medical College, Falkawn, Mizoram. The study was conducted for a period of 3 years starting from August 2016 to July 2019. Five hundred patients with superficial lymphadenopathy irrespective of age, sex, religion and socio-economic status attending Cytology OPD were included in the study. Nonspecific abscesses and cases with inadequate samples for cytodiagnosis were excluded from the study.

FNAC of lymph node/nodes of one or more sites was done with the help of 23G disposable needle

with a negative suction from 20ml syringe. From the aspirates, the smears were made and routinely stained with May-Grunwald-Giemsa stain, Acid fast bacilli (AFB) and Papanicolaou (PAP) stains were done as and when required. The stained smears were examined under a microscope. For inconclusive cytological findings, excision biopsy of the lymph node for histopathological examination was suggested.

RESULTS

[Figure 1] shows distribution of diagnosis. Nonspecific reactive lymphadenitis was the most common cytomorphological diagnosis accounting for 69% (n=344) of the total cases (n=500) followed by metastasis (n=46; 9.2%) and tuberculous lymphadenitis (n=37; 7.4%). Granulomatous lymphadenitis accounted for 6% (n=30), suppurative lymphadenitis 4.4% (n=22), necrotizing lymphadenitis 3% (n=15), Hodgkin's lymphoma 0.8% (n=4) and Non-Hodgkin's lymphoma 0.4% (n=2).

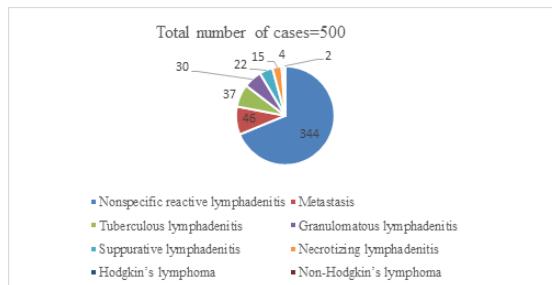


Figure 1: Distribution of diagnosis

[Table 1] shows age distribution; the youngest patient was 4 months and the oldest patient was 85 years. The maximum number of patients were in the age group of 20-29 years (21.8%), followed by 0-9

years (21%), 30-39 years (16.2%), and the least number of patients was in the age group of 70 years and above (3.6%).

Table 1: Age distribution

Age group (in years)	Total cases (n)	%
0-9	105	21
10-19	75	15
20-29	109	21.8
30-39	81	16.2
40-49	49	9.8
50-59	38	7.6
60-69	25	5
>70	18	3.6

[Figure 2] shows cytomorphological patterns in relation to sex. In both sexes, the most common cytomorphological diagnosis was nonspecific reactive lymphadenitis comprising 155 cases (71.4%) in males and 189 cases (66.7%) in females. Metastasis was the second most common diagnosis in males (n=27;12.4%), while Tuberculous lymphadenitis was the second most common diagnosis in females (n=27, 9.5%). Suppurative lymphadenitis came third in males (n=12,5.5%) while Granulomatous lymphadenitis came third in females (n=23;8.1%).

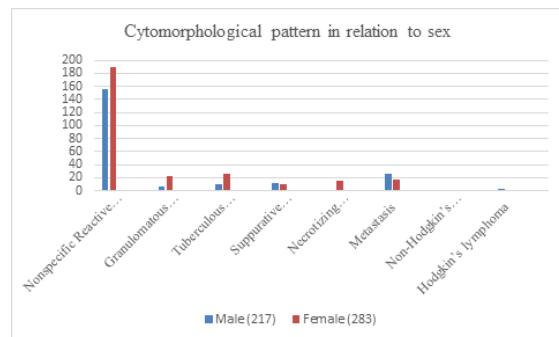


Figure 2: Cytomorphological pattern in relation to sex

Table 2: Cytomorphological pattern in relation to age

Age group (in years)	NSRL	GL	TB	SL	NL	METS	NHL	HL	Total (%)
0-9	94	1	2					1	105
10-19	57	2	7	5	4				75(15)
20-29	75	6	17	6	4	-	-	1	109(21.8)
30-39	56	12	7	2	3	1	-	-	81(16.2)
40-49	29	6	2	2	3	7	-	-	49 (9.8)
50-59	18	1	2	-	-	15	1	1	39 (7.6)
60-69	11	1	-	-	-	11	1	1	25 (5)
>70	4	1	-	-	1	12	-	-	18 (3.6)
Total (%)	344 (69)	30 (6)	37 (7.4)	22 (4.4)	15 (3)	46 (9.2)	2 (0.4)	4 (0.8)	500 (100)

(NSRL=Non-specific reactive lymphadenitis, GL=Granulomatous lymphadenitis, TB=Tuberculous lymphadenitis
SL=Suppurative lymphadenitis, NL=Necrotizing lymphadenitis, METS= Metastasis
NHL=Non-Hodgkin's lymphoma, HL=Hodgkin's lymphoma)

[Table 2] shows cytomorphological pattern in relation to age, out of the 344 cases of non-specific reactive lymphadenitis majority of the patients were in the age group of 0-9 years (n=94;27.3%); out of the 46 cases of metastasis majority of the patients were in the age group of 50-59 years (n=15; 32.6%);

out of the 37 cases of tuberculous lymphadenitis majority of the patients were in the age group of 20-29 years (n=17;45.9%)

[Figure 3] shows distribution by site, the most commonly involved lymph node group was the cervical group of lymph nodes, being enlarged in

86% (n=428) of the patients. Axillary nodes came second (n=28; 5.6%), followed by multiple sites (n=21, 4%) and inguinal lymph nodes (n=18; 3.6%).

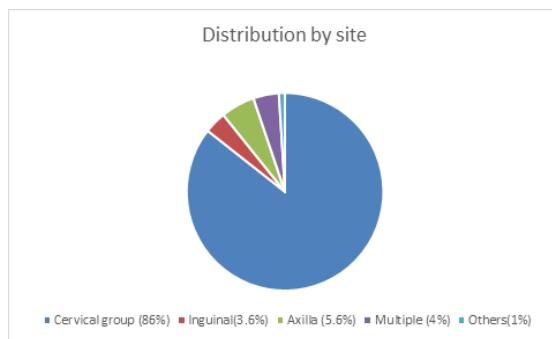


Figure 3: Distribution by site

[Table 3] shows distribution of diagnosis with site. In all the cytomorphological diagnosis the cervical

group of lymph nodes was most commonly involved group. Non-specific reactive lymphadenitis (NSRL) was the most common cytodiagnosis (n=296; 59.2%), metastasis was seen in 8.2% (n=41) of cervical lymphadenopathy, tuberculous lymphadenitis in 6.2% (n=31), granulomatous lymphadenitis in 5.4% (n=27) and suppurative lymphadenitis in 3.2% (n=16).

In the axilla, NSRL (n=17; 3.2%) was the most common cytodiagnosis followed by suppurative lymphadenitis (n=5; 1%) and metastasis (n=3; 0.6%).

NSRL (n=15; 3%) was also the commonest finding in inguinal lymphadenitis. 11 patients (2.2%) with multiple site involvement had NSRL, 5 patients (1%) had tuberculous lymphadenitis and metastasis was seen in 1 patient (0.2%) of patient with multiple sites lymphadenopathy.

Table 3: Distribution of diagnosis with site.

Diagnosis	Cervical (%)			Axilla (%)	Inguinal (%)	Other sites (%)	Multiple sites (%)	Total (%)
	Supra clavicular	Others	Total					
NSRL	10 (2)	286 (57.2)	298 (59.2)	17 (3.2)	15 (3)	5 (1)	11 (2.2)	344 (68.8)
GL	5 (1)	22 (4.4)	27 (5.4)	1 (0.2)	1 (0.2)	0	1 (0.2)	30 (6)
TBL	6 (1.2)	25 (5)	31 (6.2)	1 (0.2)	0	0	5 (1)	37 (7.4)
SL	1 (0.2)	15 (3)	16 (3.2)	5 (1)	1 (0.2)	0	0	22 (4.4)
NL	1 (0.2)	11 (2.2)	12 (2.4)	1 (0.2)	0	0	2 (0.4)	15 (3)
NHL	0	1 (0.2)	1 (0.2)	0	0	0	1 (0.2)	2 (0.4)
HL	0	4 (0.8)	4 (0.8)	0	0	0	0	4 (0.8)
METS	13 (2.6)	28 (5.6)	41 (8.2)	3 (0.6)	1 (0.2)	0	1 (0.2)	46 (9.2)
TOTAL	36	392		28	18	5	21	500

(NSRL=Non-specific reactive lymphadenitis, GL=Granulomatous lymphadenitis, TB=Tuberculous lymphadenitis

SL=Suppurative lymphadenitis, NL=Necrotizing lymphadenitis, METS= Metastasis

NHL=Non-Hodgkin's lymphoma, HL=Hodgkin's lymphoma)

[Figure 4] shows distribution of benign and malignant lesions. In this study, benign lymph node enlargements accounted for 89.6% (n=448) and the remaining 10.4% (n=52) were malignant.

[Table 4] shows distribution of benign and malignant lymphadenopathy with age. In the age group of less than 40 years, benign lymphadenopathy was diagnosed in 99.2% (n=375) and malignant in 0.8% (n=3), while in patients above 40 years benign lymphadenopathy was diagnosed in 60% (n=73) and malignant lymphadenopathy in 40% (n=49) of the cases.

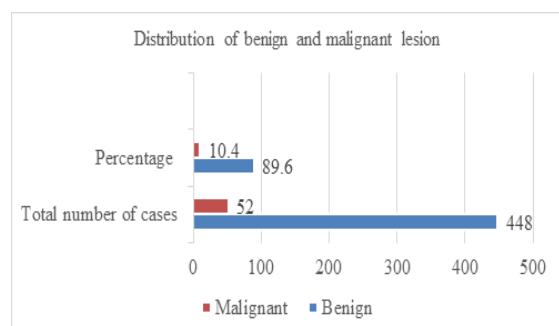


Figure 4: Distribution of benign and malignant lesion

Table 4: Distribution of benign and malignant cases in relation to age

Age group	Type of lesion		P value
	Benign (%)	Malignant (%)	
< 40 years	375 (99.2)	3 (0.8)	<0.001
>40 years	73 (60)	49 (40)	
Total	448	52	500

DISCUSSION

Lymphadenopathy is of great clinical significance as underlying diseases may range from a treatable infectious etiology to malignant neoplasms. In fact, it is also essential to establish that the swelling in question is a lymph node. Fine needle aspiration

cytology (FNAC) plays a vital role in solving these issues, nowadays being recognized as a rapid diagnostic technique because of its simplicity, cost effectiveness, early availability of results, accuracy and minimal invasion. FNAC is particularly helpful in the work-up of cervical masses and nodules because biopsy of cervical adenopathy should be

avoided unless all other diagnostic modalities have failed to establish a diagnosis.

Lymphadenopathy is a frequently encountered clinical problem and the first question that must be addressed by the clinician usually is whether the swelling is malignant or a benign reactive process. Fine needle aspiration is a simple, rapid and inexpensive procedure which can be carried out in an OPD setting and is very much patient compliant. It has become the first line of investigation for any lymph node swelling and in many centers lymph node biopsy is considered only in cases when the definitive diagnosis cannot be made with FNAC.

Nonspecific reactive lymphadenitis was the commonest cytomorphological diagnosis (n=344; 69%). Similar finding was reported by Hirachand S et al,^[1] Hafez NH et al,^[2] Silas OA et al and Annam V et al.^[3,4] Metastasis was the second most common cause of lymphadenopathy (n=46; 9.2%). However, in the studies conducted by Qadri SK et al,^[5] Zhou J et al,^[6] Anila RK et al,^[7] Martins MR et al,^[8] Roy A et al,^[9] and Steel BL et al,^[10] metastatic lymph node was found to be the commonest cause of lymphadenopathy. Tuberculous lymphadenopathy was the third most common pattern which accounted for 7.4% (n=37). Similar finding was observed by Hafez NH et al.^[2] However, it was found to be the commonest cytomorphological pattern in the studies conducted by Khajuria R et al,^[11] Ahmad T et al,^[12] and Saira Fatima et al.^[13] Granulomatous lymphadenitis comprises 6% (n=30) in our study. In contrast, Arun Roy et al,^[9] detected 0.6% and Khan RA et al,^[14] detected 9% cases of Granulomatous lymphadenitis in their study and was listed as the most common cytologic pattern of lymphadenopathy.

Malignant lymph node enlargement was seen in 10.4% of the patients whereas benign lymphadenopathy was observed in 89.6% of the patients which corresponds to the findings of Bezabih M et al,^[15] Silas OA et al,^[3] and Hirachand S et al.^[1] However, studies by Martins MR et al,^[8] and Steel BL et al,^[10] found malignant lymph node more common than benign lymphadenopathy. This could be attributed to epidemiological variation of disease between the developed and developing countries. Majority of the lymphadenopathies are of reactive nature due to various infections like tuberculosis in developing countries while malignancies are more common in developed countries while diseases like tuberculosis is not common.

Malignant lesion was found to be more common in age group above 40 years as compared to below 40 years i.e., 40% and 0.8% respectively. The significance was tested using Pearson Chi-Square and it was found to be significant (P value = <0.001).

The age of the patients ranged from 4 months to 85 years. The maximum number of patients was in the

age group of 20-29 years (21.8%), similar findings were observed by Bezabih M et al and Agarwal D et al.^[15,16]

Of the total 500 patients, the number of male patients were 217 (43.4%) and female patients were 283 (56.6%) which showed a slight female preponderance with a male: female ratio of 1:1.3. This finding is comparable to the findings of Hirachand S et al,^[1] Steel BL et al,^[10] and Saira Fatima et al.^[13] However, in the studies conducted by Malhotra AS et al,^[17] Silas OA et al,^[3] and Ahmad T et al,^[12] there was a male preponderance. Patients in the age group of 0-9 years were the most commonly involved age group in NSRL (n=94; 27.3%). This could be attributed to increased number of patients belonging to this age group in the study and may be because of sampling of lymphadenopathy which are not significant. Tuberculous lymphadenitis was most common in the age group of 20-29 years (n=17; 45.9%) and granulomatous lymphadenitis in the age group of 30-39 years (n=12; 40%). Reactive hyperplasia was seen commonly in the first three decades of life; tuberculous and granulomatous lymphadenitis in the second and third decades of life. Khajuria R et al,^[11] also reported that reactive hyperplasia was seen most often (74.5%) in the first two decades of life, tuberculous lymphadenitis (58.9%) in the second and third decade and 88% of metastatic carcinoma over 40 years of age. Olu-Eddo AN et al,^[18] reported that metastatic disease was the predominant cause of lymph node enlargement above 45 years. Similarly, in this study metastasis was observed commonly in older patients; the commonest age group was 50-59 years (n=15; 32.6%) followed by above 70 years (n=12; 26%). Suppurative lymphadenitis was commonest in the first two decades of life (n=11; 50%), similar findings were observed by Bezabih M et al.^[15] This could be due to frequent infections by pyogenic organisms like staphylococcus. Lymphomas were diagnosed only in patients above 50 years of age, sample size was very small to come to any definite conclusion.

NSRL was the most common cytomorphological pattern observed in both the sex (males=71.4% and females=66.7%). Tuberculous lymphadenitis was detected most commonly in females in the age group of 20-29 years (n=17; 45.9%); similarly, Olu-Eddo AN et al,^[18] also reported that tuberculous lymphadenitis was commonest in young adult females (15-24 years old).

Cervical region was the most commonly affected site accounting for 86% of the total cases and was also the commonest site involved in all the disease patterns observed in the study. Khajuria R et al,^[11] Getachew A et al,^[19] and Olu-Eddo AN et al,^[18] also observed similar patterns in their study. This may be partly due to easy accessibility of cervical lymph nodes for examination and evaluation. Out of the 36 patients having supraclavicular lymphadenopathy,

the most common pathology observed was metastasis accounting for 36.1% of the cases which was in accordance with studies done by Gupta RK et al and Gupta N et al.^[20,21]

In the axilla, NSRL (n=17; 3.2%) was the most common cytodiagnosis followed by 3 cases (0.6%) of metastasis with primary from the breast. Bezabih M et al,^[15] Gupta RK et al,^[22] and Alam K et al,^[23] also reported breast as the commonest primary in axillary metastasis.

NSRL (n=15;3%) was the predominant finding in inguinal lymphadenopathies with 1 case each of granulomatous, suppurative and metastasis. Khajuria R et al,^[11] and Gupta RK et al,^[24] also reported similar findings. However, Bezabih M et al,^[15] reported tuberculous lymphadenitis as the commonest finding in the inguinal region.

CONCLUSION

Lymph nodes are the most widely distributed and easily accessible component of the lymphoid tissue and hence are frequently examined for diagnosis of lymphoreticular disorders. The knowledge of a particular geographical area is a very useful diagnostic aid for clinicians and pathologists alike.

In the present study, nonspecific reactive lymphadenitis was the commonest cytomorphological diagnosis affecting all age groups. The second commonest disease was metastasis which shows and reflects the high incidence of cancer in the state and majority were diagnosed with an unknown primary. This greatly shows the necessity to increase awareness of possible warning signs of cancer, among physicians, nurses and other health care providers as well as among the general public, as early detection can have a great impact on the disease, it increases the chances for successful treatment and thereby reducing the high cancer mortality which is at present very high in the state. Malignancy was found to be more common in the age group of >40 years as compared to those below 40 years and the significance was statistically proven. The third commonest cause of lymphadenopathy was tuberculous lymphadenitis, this shows a high disease burden of tuberculosis in the community and in view of the prevailing HIV/AIDS scenario in the state, tuberculous lymphadenitis needs to be ruled out in every patient presenting with lymphadenopathy. The commonest site involved was cervical region. There was no statistical significance between the site involved and sex of the patient and between disease pattern and sex of the patients.

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